



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/611,924	07/03/2003	Kazuhiko Iwai	116430	5665
25944	7590	06/23/2004	EXAMINER	
OLIFF & BERRIDGE, PLC			ROPEC, MARK T	
P.O. BOX 19928			ART UNIT	
ALEXANDRIA, VA 22320			PAPER NUMBER	

1751

DATE MAILED: 06/23/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/611,924	IWAI ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Mark Kopec	1751	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
  - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
  - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
  - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)             | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. ____.  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date ____.   | 6) <input type="checkbox"/> Other: ____.                                    |

Art Unit: 1751

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for

Art Unit: 1751

establishing a background for determining obviousness under 35

U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary.

Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-10 are rejected under 35 U.S.C. 102(a)/(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Iwai et al (6,579,490).

Iwai et al (6,579,490) discloses an apparatus for generating compression waves in a conductive liquid comprises a vessel containing a conductive liquid and an electromagnetic force

Art Unit: 1751

applying means provided around the vessels for generating the compression waves to achieve improvement after solidification of the liquid by enhancing strength of the compression waves by setting the ac frequency "f" of ac electromagnetic force applying means only within the range defined by the expression  $2/(L \cdot \mu \cdot \sigma) \leq f \leq (c \cdot \mu \cdot \sigma) / 2\pi$ , wherein f is a major frequency when a waveform of an electromagnetic force is developed by the Fourier transform, for a non-sine waveform, L is a characteristic length of the system, such as a depth or a radius of the vessel,  $\mu$  is the permeability of the conductive liquid,  $\sigma$  is the electric conductivity of the conductive liquid, and c is the propagation velocity of the compression waves in the conductive liquid (Abstract). Further, the invention discloses an apparatus for generating compression waves in a conductive liquid, in which the dc magnetic field generating electromagnetic coil is provided around the circumference of the vessel provided with the electrodes. The invention discloses an apparatus for generating compression waves in a conductive liquid, in which the dc magnetic field generating electromagnetic coil is a superconducting magnet, and the vessel with a pair of the electrodes is inserted in the bore of the superconducting magnet. (Col 2, lines 8-17). The disclosed dc magnetic

Art Unit: 1751

apparatus and ac frequency performance meet each of applicant's "applying" steps. Furthermore, the mathematical relationship (frequency, length, permeability, conductivity and propagation velocity) disclosed at Col 1, lines 35-57 appears to meet applicant's claimed mathematical formula.

The reference is anticipatory.

In the alternative that any minor modifications are necessary to meet the claimed invention, such as minor variation in frequency or strength of magnetic field (B), such modifications would be well within the purview of the skilled artisan. "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

Claims 1-10 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Rummel et al (4,244,796).

Rummel et al (4,244,796) discloses method of influencing the distribution of different constituents in an electrically conductive liquid, especially a molten metal, wherein an electrical current is conducted through the electrically conductive liquid and at the same time there is formed a magnetic field approximately perpendicular to the direction of

Art Unit: 1751

flow of the electric current, in order to reduce or increase the effect of the differences in the density of the constituents (Abstract). The method aspects of the present invention are manifested by the features that an electrical current is conducted through the liquid and at the same time there is formed a magnetic field approximately perpendicular to the direction of flow of the electrical current, in order to change i.e., reduce or increase the effect of the differences in the density of the constituents (Col 1, line 65 to Col 2, line 3). employed an alternating current and a magnetic alternating field and that there be satisfied the following condition: ##EQU1## (Col 2, lines 45-48) wherein  $d$  constitutes the largest diagonal of the cross-sectional area disposed perpendicular to the direction of current flow,  $f$  the frequency,  $\mu$  the permeability and  $H$  the electrical conductivity. In the case of circular cross-sections  $d$  constitutes the diameter and for polygonal cross-sections the largest diagonal. The alternating current can be of random frequency. It is also advantageous to employ a constant or steady field and direct current or a combination of both. It is advantageous to horizontally arrange the magnetic field and the direction of the current (Col 2, lines 41-59). The disclosed dc magnetic apparatus and ac frequency performance meet each of applicant's "applying" steps.

Art Unit: 1751

Furthermore, the mathematical relationship (frequency, length, permeability, conductivity and propagation velocity) disclosed at Col 1, lines 35-57 appears to meet applicant's claimed mathematical formula.

The reference is anticipatory.

In the alternative that any minor modifications are necessary to meet the claimed invention, such as minor variation in frequency or strength of magnetic field (B), such modifications would be well within the purview of the skilled artisan. "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

Claims 1-10 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Kawai et al (Materials Transactions, Vol 42, No.2).

Kawai et al (Materials Transactions, Vol 42, No.2) discloses a new generating method of compression waves in a liquid metal has been proposed in which a static magnetic field and an alternating current are simultaneously imposed. The theoretical expressions of intensities and distributions of pressure and velocity accompanied with the compression wave have been derived (Abstract). The disclosed dc magnetic apparatus

Art Unit: 1751

and ac frequency performance meet each of applicant's "applying" steps. Furthermore, the mathematical relationship (frequency, length, permeability, conductivity and propagation velocity) disclosed in the "Theoretical Analysis" section appears to meet applicant's claimed mathematical formula.

The reference is anticipatory.

In the alternative that any minor modifications are necessary to meet the claimed invention, such as minor variation in frequency or strength of magnetic field (B), such modifications would be well within the purview of the skilled artisan. "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

In view of the foregoing, the above claims have failed to patentably distinguish over the applied art.

Applicant is reminded that any evidence to be presented in accordance with 37 C.F.R. 1.131 or 1.132 should be submitted before final rejection in order to be considered timely.


The remaining references listed on forms 892 and 1449 have been reviewed by the examiner and are considered to be cumulative to or less material than the prior art references relied upon in the rejection above.

Art Unit: 1751

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark Kopec whose telephone number is (571) 272-1319. The examiner can normally be reached on Monday - Friday from 9:30 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dr. Yogendra Gupta can be reached on (571) 272-1316. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Mark Kopec  
Primary Examiner  
Art Unit 1751

MK  
June 21, 2004